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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/732,764	12/10/2003	Gisle Dankel	1801270.00135US1	6964

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EXAMINER	
WEI, ZHENG	

ART UNIT	PAPER NUMBER
2194	

DATE MAILED: 08/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/732,764	DANKEL ET AL.	
	Examiner	Art Unit	
	Zheng Wei	2191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 April 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/10/03, 8/20/04, 05/27/2005*
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the application filed on 12/10/2003.
The priority date for this application is: 04/22/2003.
Claims 1-27 are pending and have been examined.

Drawings

2. In addition to Replacement Sheets containing the corrected drawing figure(s), applicant is required to submit a marked-up copy of each Replacement Sheet including annotations indicating the changes made to the previous version. The marked-up copy must be clearly labeled as "Annotated Sheets" and must be presented in the amendment or remarks section that explains the change(s) to the drawings. See 37 CFR 1.121(d)(1). Failure to timely submit the proposed drawing and marked-up copy will result in the abandonment of the application.

3. The drawings are objected to under 37 CFR 1.84(h)(5) because Figures 12, 13B and 13C show modified forms of construction in the same view. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet"

pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities:
   - In page 21, paragraph [0083], "translator code 21" is a typo. It should be change to "translated code 21".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 2, 8-11, 17-20, 26 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Zheng (Zheng et al., "PA-RISC to IA-64 Transparent Execution, No Recompilation", IEEE, March 2000)

Claims 1, 10 and 19: Zheng discloses a method, apparatus and software can be stored in a computer-readable medium that is executable by a computer to perform the method of translating program code, comprising:

- Decoding said program code; (Page 48, section "HOW IT WORKS", "When the user executes an application of any kind on the IA-64 system, the HP-UX kernel starts a normal execution process. If it detects a PA-

RISC executable, it maps the executable's text and data segments, loads the Aries start-up module, and transfers control to it.")

- Applying an interpreting algorithm to identify whether said program code is interpretable by an interpreter; (Page 48, section "Start-up and runtime modules", "The runtime module is the hub of Aries. It is responsible for steering the control flow within a running emulation process. It tracks how many times a block has executed and decides when to invoke the dynamic translator to translate a PA-RISC block.", section "HOW IT WORKS", "The runtime module tracks how often each block executes. If a block has executed a fixed number of time (meets a translation threshold), the runtime module then invokes the dynamic translator...");
- If said program code is interpretable (Page 48, section "HOW IT WORKS", "The start-up module then loads the other Aries components and transfers control to the Aries runtime module, which invokes the interpreter to start the actual emulation.");
- Translating said program code using a translator when said program code is not interpreted. (Page 48, section "HOW IT WORKS", "If a block has executed a fixed number of times, the runtime module then invokes the dynamic translator, which translates the PA-RISC block into a block of native IA-64 instructions...")

Claims 2, 11 and 20: Zheng also discloses that the method, apparatus and executable software in computer-readable medium wherein said program code further comprises basic block of program code. (Page 49, section "Interpreter", "Thus, Aries interprets any PA-RISC basic block that contains this kind of instruction instead of translating it.")

Claims 3, 12 and 21: Zheng further discloses a method, apparatus and software can be stored in a computer-readable medium that is executable by a computer

to perform the method of translating program code, wherein the step of applying a interpreting algorithm comprises determining whether instructions in said program code are included in a subset of instructions capable of being interpreted by the interpreter. (Page 48, section "Interpreter", "The fast interpreter is the emulation safety net because it handles all possible blocks, including those not yet translated or too complex to translate. Certain PA-RISC instructions have no simple matching IA-64 instructions that are functionally equivalent. For these, interpretation makes more sense than translation into native IA-64 instructions.", "The interpreter also identifies blocks that are difficult to translate, as in figure 3, marking them as 'bad blocks'", Page 50, Figure 3, notes, "A bad instruction block in Aries, The Aries interpreter is responsible for identifying these blocks")

Claims 8, 17 and 26: Zheng discloses a method, an apparatus and an executable software stored in a computer-readable medium as in claims 1, 10 and 19 above and Zheng further discloses that applying interpreting algorithm to identify whether the program code is interpretable comprises determining whether an execution count of the program code is below a translation threshold, wherein the program code is translated by the translator if the execution count of the program code is greater than or equal to the translation threshold. (Page 49, Figure 2, notes, "If it has not been translated, the runtime module looks at how many times that block has executed and compares it against a translation threshold to determine if the target block is ready for translation. If it does not qualify, the Aries runtime module increments the execution count for that block and returns control to the interpreter. If the block has reached the translation threshold, the Aries runtime module invokes the translator to produce dyncode.")

Claims 9, 18 and 27: Zheng discloses a method, an apparatus and an executable software stored in a computer-readable medium as in claims 2, 11 and 20 above, Zheng further discloses the step of applying interpreting algorithm to identify whether the basic block of program code is interpretable comprises

determining whether an execution count of the program code is below a translation threshold, wherein the basic block of program code is translated by the translator if the execution count of the basic block of program code is greater than or equal to the translation threshold. (Page 49, Figure 2, notes, "If it has not been translated, the runtime module looks at how many times that block has executed and compares it against a translation threshold to determine if the target block is ready for translation. If it does not qualify, the Aries runtime module increments the execution count for that block and returns control to the interpreter. If the block has reached the translation threshold, the Aries runtime module invokes the translator to produce dyncode.")

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 4-7, 13-16 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng in view of Warnes (Peter Warnes, US 7,051,189 B2).

Claims 4, 13 and 22: Zheng discloses a method and apparatus for performing interpreter optimizations during program code conversion as in claims 3, 12 and 21 above about how to use "execute count" to switch between code interpretation and translation and how to determining the subset of instructions capable of being interpreted by the interpreter, but does not disclose how to select the

subset of instructions as a portion of an entire instruction set for the program code. However, Warnes discloses a method and apparatus for optimizing the instruction set of a digital processor code using code compression. (Fig.1, steps 108, 110, Col.9, lines 1-50, "The ultimate determination is made by calculating the program size using the proposed new instruction set. If the size is sufficiently small, the compressed instruction set is selected."). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Warnes' method of selecting compressed instruction set in Zheng's start-up or runtime modules to configure the interpreter supported instruction set. One would have been motivated to use portion of entire instruction set to interpret most of program code in Zheng's interpreter and pass other program code to Zheng's translator in order to further improve the performance by reducing some interpreting time.

Claims 5-7, 14-16 and 23-25 : Zheng and Warnes disclose the method and apparatus as in claims 4, 13 and 22 above, but Zheng does not disclose selecting instructions from the most frequently executed instructions, using selected instruction to interpret program application and selected instruction that is capable of interpreting a majority of the basic blocks of the program application. However, Warnes discloses that the subset of instructions selecting step comprises selecting instructions from the entire instruction set which are executed most frequently across at least one program application. (Fig.1, step 104, "determine static frequency of each instruction type", step 106, "sort instruction types by frequency", step 108, "determine number and type of instructions necessary for correct program execution", step 110, "create compressed instruction set encoding"). Warnes also discloses that the selected subset of instruction is capable of interpreting a specific target program application or a majority of the basic blocks of program application (Col.9, lines 20-38). It would have been obvious to one having ordinary skill in the art at the time the invention was made to integrate Warnes' feature that selects the most

frequently executed subset of instructions which can be used to interpret majority instructions or basic block of the program code in Zheng's optimization method which only uses "execute counter". One would have been motivated to combine Warnes' and Zheng's optimization methods together to optimize the translation procedure for the program code. If the instruction or basic blocks can not be interpreted by interpreter which contains the most frequently executed instruction set, it is passed to the translator to translate. So the interpreter with "reduced instruction set" can be executed faster and more efficiently during the whole translation process.

Conclusion

9. The prior art made of record and hot relied upon is considered pertinent to applicant's disclosure:
   - Torvalds et al (US 6,880,152 B1) discloses a method of determining a mode of code generation.
   - Hőlzle et al (US 6,237,141 B1, 5,995,754) discloses a method and apparatus for dynamically optimizing byte-coded programs.
   - Erik et al, "Welcome to the opportunities of binary translation", pages 54-59, 2000 IEEE
   - Ebcioglu et al, "Dynamic Binary Translation and Optimization", IEEE Transactions on computers. Vol.50, No. 6, June 2001, pages 529-548
   - Sato, (US 6,345,384 B1) discloses an optimized program code generator, a method for compiling a source text with a plurality of instruction sets.
   - Godfrey, (US 6,099,585) discloses a system and method for streamlined execution of instructions.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zheng Wei whose telephone number is (571) 270-1059. The examiner can normally be reached on Monday-Thursday 14:00-15:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Myhre can be reached on (571) 270-01065. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ZW
08/10/2006

James W. Myhre
Supervisory Patent Examiner
08/10/2006